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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------|------------------|
| 10/755,448 | 01/13/2004 | Masao Kondo | 020296A | 1084 |
| 38834 | 7590 | 07/25/2005 | | |
| WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036 | | | EXAMINER LE, THAO X | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2814 | |

DATE MAILED: 07/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/755,448 | KONDO ET AL. | |
| | Examiner | Art Unit | |
| | Thao X. Le | 2814 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5 and 8-17 is/are pending in the application.
- 4a) Of the above claim(s) 11-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5 and 8-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/093,519.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4/26/5, 2/4/5, 1/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent ³granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 5, and 8-10 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6693033 to Edwards, Jr. et al.

Regarding claim 5, Edwards discloses a semiconductor device in fig. 6 comprising: a single-crystal silicon substrate 22, column 2 lines 15 and 18; a first single-crystal oxide thin film 26, column 2 lines 65-66, having a sodium chloride structure formed on the single-crystal silicon substrate 22, in an epitaxial relationship therewith, fig. 5; and a second single-crystal oxide thin film 42 having a perovskite structure, column 4 lines 3 and 13, on the first single-crystal oxide thin film 26 in an epitaxial relationship therewith, said first single-crystal oxide thin film 26 being selected from the group consisting of CaO, SrO, and BaO, column 3 line 4.

Although the prior art does not specially disclose the sodium chloride structure, Edwards inherently discloses teaching of that limitation because the disclosed material (SrO or BaO) of Edwards is identical or substantially identical

Art Unit: 2814

in structure or composition with the claimed material, claimed properties or functions are presumed to be inherent. *In re Best*, 195 USPQ 430, 433 (CCPA 1977) and MPEP 2112.01.

Regarding claim 8, Edwards discloses a semiconductor device in fig. 6 comprising: a single-crystal silicon substrate 22, column 2 lines 15 and 18; a first single-crystal oxide thin film 26, column 3 line 4-6, having a sodium chloride structure formed on the single-crystal silicon substrate 22 in an epitaxial relationship therewith, and a second single-crystal oxide 42 thin film having a perovskite structure, column 4 lines 3 and 13, formed on the first single-crystal oxide thin film 26 in an epitaxial relationship therewith, and an amorphous layer 44, column 4 line 20, formed between the single-crystal silicon substrate 22 and the first single-crystal oxide thin film 26, fig. 6.

Regarding claim 9, Edwards discloses a semiconductor device in fig. 6 wherein the first single-crystal oxide thin film 26 is selected from the group consisting of BaO, column 3 line 4.

Regarding claim 10, Edwards discloses the semiconductor device wherein the second single-crystal oxide thin film 42 is selected from the group consisting of SrTO₃ or BaTiO₃ (alkaline earth metal titanates), column 4 line 9.

3. Claim 5 is rejected under 35 U.S.C. 102(e) as being anticipated by US 6822302 to Higuchi et al.

Regarding claim 5, Higuchi discloses a semiconductor device in fig. 3 comprising: a single-crystal silicon substrate 11, column 5 lines 6; a first single-crystal oxide thin film 12, column 5 lines 22-24, having a sodium chloride structure formed on

Art Unit: 2814

the single-crystal silicon substrate 11, in an epitaxial relationship therewith, column 5 line 30 fig. 3; and a second single-crystal oxide thin film 13, column 6 lines 7-9, having a perovskite structure, column 6 line 10, on the first single-crystal oxide thin film 12 in an epitaxial relationship therewith, said first single-crystal oxide thin film 12 being selected from the group consisting of CaO, SrO, and BaO, column 5 line 37.

Response to Arguments

4. Applicant's arguments filed 27 June 2005 have been fully considered but they are not persuasive. The Applicant argues that Edwards discloses a compound may be formed of Sr_2SiO_4 , SrSiO_3 ..., or mixture thereof because the removal of the oxygen from a native oxide film SiO_x formed on a Si substrate by depositing an oxide of alkali earth element such as SrO or BaO by an MBE. Thus, the film 26 of Edwards cannot have a rock salt or sodium chloride structure. This is not persuasive because

a. The layer 26 of Edwards comprises SrO or BaO, column 3 line 4, that is identical to the claimed materials; thus it would meet the claim limitation recited 'first single-crystal oxide thin film being selected from the group consisting of CaO, SrO, and BaO'.

b. Edwards clearly describes the 'bare' Si substrate means that the substrate has been cleaned to remove any oxides, contaminants, or other foreign material, column 2 lines 38-43. Therefore, the removal of the oxygen from a native oxide film SiO_x formed on a Si substrate is NOT necessary as seen in fig. 5 and the layer 26 would have an epitaxial relationship with the Si substrate.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

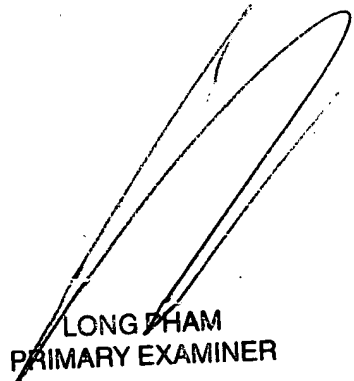
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X. Le whose telephone number is (571) 272-1708. The examiner can normally be reached on M-F, from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on (571) 272 -1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

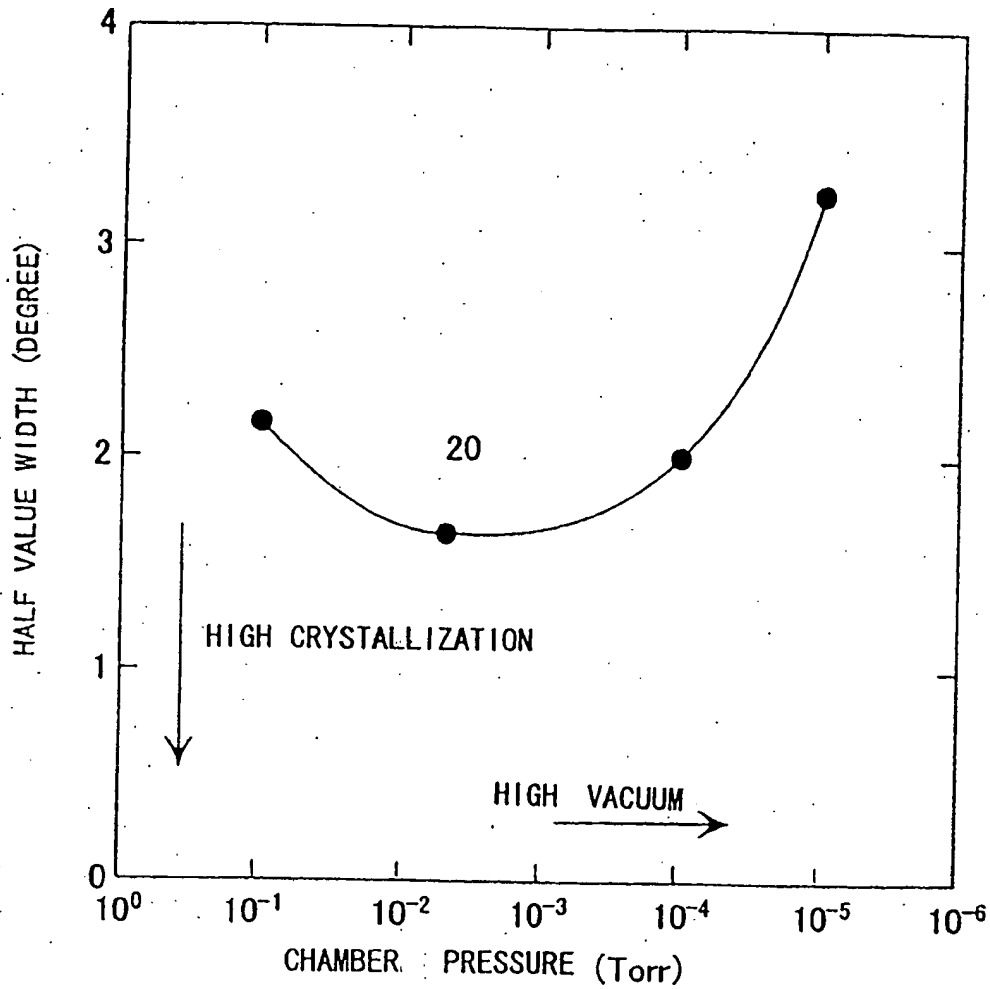
Thao X. Le
Patent Examiner
20 July 2005



LONG PHAM
PRIMARY EXAMINER



FIG. 5



OIL
To
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